



Universe Division Perspective

Anne L. Kinney
Director



Committee Charter

1. The Committee shall draw on the expertise of its members and other sources to provide advice and recommendations to NASA on conducting advanced telescope searches for Earth-like planets and habitable environments. Recommendations, to be provided by the Committee, will help guide Agency program prioritization, budget formulation, facilities and human capital planning, and technology investment.
2. The Committee shall function solely as an advisory body and will comply fully with the provisions of the FACA.
3. The Committee reports to the Associate Deputy Administrator for Systems Integration (ADA-SI) and to the Administrator.



Strategic Roadmap Definition

Strategic Roadmap: A coordinated and comprehensive longitudinal strategy, with key achievements, options, and decision points identified, that provides a foundation for NASA's long-term priorities and investments

There will be a roadmap for each Agency-level Objective

13 roadmaps respond to 18 objectives

Consistent contents and structure to simplify integration

NASA is also developing a set of 15 "Capability Roadmaps"

Based on Aldridge Commission recommendations

Iterate to ensure consistency with Strategic Roadmaps as they develop



Essential Roadmap Elements

Broad science and exploration goals, priorities, recommended activities or investigations, and a summary of anticipated discoveries and achievements

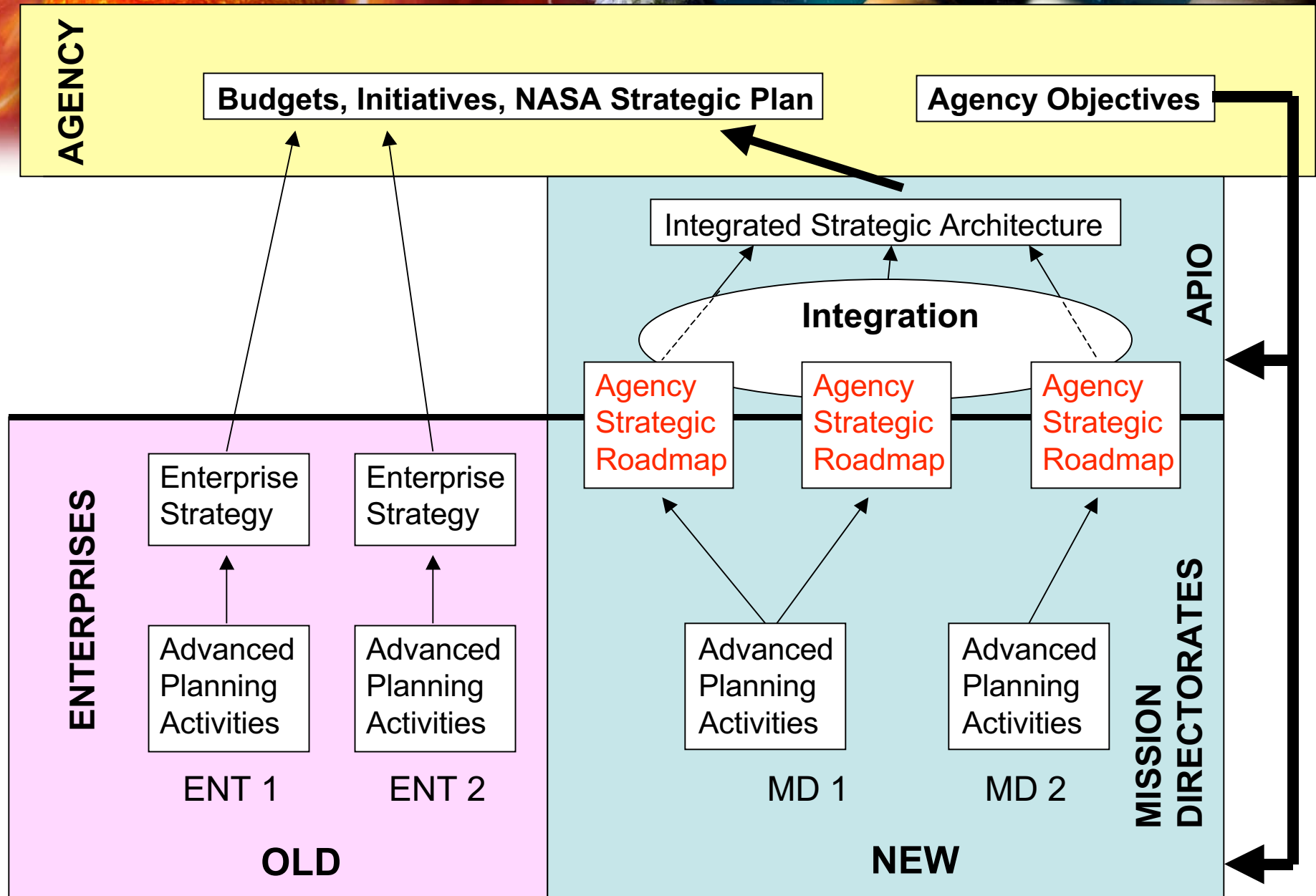
Suggested implementation approach and mission sets

High-level milestones, options, and decision points

Key dependencies on and relationships to other Strategic Roadmaps

Identification of required capabilities, facilities, human capital, and infrastructure

Strategic Planning – Old vs. New



NASA's Strategic Roadmaps

A coordinated and comprehensive longitudinal strategy, with key decision points identified, that provides a foundation for investment decisions and priorities.

Roadmap	Chairs (HQ Directorate, Center, External)	APIO	Coordinators Directorate
Robotic and Human Lunar Exploration	Adm. (ret.) Craig Steidle (HQ/ESMD) and William Readdy (HQ/SOMD) Gen. (ret.) Jefferson Howell (JSC) Gen. (ret.) Tom Stafford	Frank Bauer (GSFC/HQ)	Scott Wilson (ESMD)
Robotic and Human Exploration of Mars	Al Diaz (HQ/SMD) Dr. Charles Elachi (JPL) Tom Young (Lockheed Martin, ret.)	Judy Robey (HQ)	Dr. Mike Meyer (SMD)
Solar System Exploration	Orlando Figueroa (HQ/SMD) Scott Hubbard (ARC) Dr. Jonathan Lunine (Uni. of Arizona)	Judy Robey (HQ)	Dr. Carl Pilcher (SMD)
Search for Earth-Like Planets	Dr. Ghassem Asrar (HQ/SMD) Dr. Charles Beichman (JPL) Dr. Adam Burrows (Uni. of Arizona)	Dr. Rich Capps (JPL, ret.)	Dr. Eric Smith (SMD)
Exploration Transportation System	Adm. (ret.) Craig Steidle (HQ/ESMD) Jim Kennedy (KSC) Gen. (ret.) Charles Bolden	Dr. Dana Gould (LaRC)	Mark Borkowski (ESMD)
International Space Station	Mark Uhran (HQ/SOMD) Bob Cabana (JSC) Adm. (ret.) Tom Betterton	Stacey Edgington (HQ)	Dr. Michele Gates (SOMD)
Space Shuttle	<i>Deferred*</i>	<i>Deferred*</i>	<i>Deferred*</i>



NASA's Strategic Roadmaps (2 of 2)

Roadmap	Chairs (HQ Directorate, Center, External)	APIO	Coordinators Directorate
Universe Exploration	Dr. Anne Kinney (HQ/SMD) Dr. Nick White (GSFC) Dr. Kathy Flanagan (MIT)	Dr. Rich Capps (JPL, ret.)	Dr. Mike Salamon (SMD)
Earth Science and Applications from Space	Orlando Figueroa (HQ/SMD) Dr. Diane Evans (JPL) Dr. Charles Kennel (UCSD/Scripps)	Dr. Azita Valinia (GSFC)	Gordon Johnston (SMD)
Sun-Solar System Connection	Al Diaz (HQ/SMD) Dr. Franco Einaudi (GSFC) Dr. Timothy Killeen (NCAR)	Dr. Azita Valinia (GSFC)	Dr. Barbara Giles (SMD)
Aeronautical Technologies	Terry Hertz (HQ/ARMD) None (Center) James Jamieson (Boeing)	Vicki Regenie (DFRC/JPL)	Yuri Gawdiak (ARMD)
Education	Dr. Adena Loston (HQ/Office of Education) Dr. Julian Earls (GRC) Dr. France Cordova (Uni. of California, Riverside)	Ashley Stockinger (HQ)	Dr. Shelley Canright (Office of Education)
Nuclear Systems	Adm. (ret.) Craig Steidle (HQ/ESMD) Chris Scolese (GSFC) Dr. John Ahearne (Duke Uni.)	Dr. Perry Bankston (JPL)	Jay Jenkins (ESMD)

A horizontal banner at the top of the slide features a collage of celestial bodies. From left to right, it includes a large, bright orange sun or star, a blue and white planet with a ring system (resembling Saturn), a smaller orange planet, and a large gas giant with prominent brown and white bands (resembling Jupiter). The background is a deep space scene with stars and nebulae.

Astronomy Roadmapping

Exploration of the Universe:
Origin, Structure, Evolution, Destiny

Advanced Telescope Searches
for Earth-like Planets

<u>Co-Chairs</u>	<u>Co-Leads</u>
A. Kinney	M. Salamon
N. White	R. Capps
K. Flanagan	

Jan 25 @ DC

K. Flanagan, Chair
“SEU” Roadmap team

<u>Co-Chairs</u>	<u>Co-Leads</u>
G. Asrar	E. Smith
C. Beichman	R. Capps
A. Burrows	

Feb 15 @ Tucson

A. Burrows, Chair
“Origins” Roadmap team



Universe Exploration Strategic Roadmap Committee

Committee Members

Anne Kinney, NASA Science Mission Directorate, *co-chair*

Nick White, Goddard Space Flight Center, *co-chair*

Kathy Flanagan, Massachusetts Institute of Technology, *co-chair*

Chuck Bennett, Goddard Space Flight Center

Craig Hogan, University of Washington

Steve Kahn, Stanford University, Stanford Linear Accelerator Center

Rene Ong, University of California, Los Angeles

Sterl Phinney, California Institute of Technology

Ron Polidan, Northrop Grumman Space Technology

Michael Shull, University of Colorado

Bob Stern, Lockheed Martin

Michael Turner, National Science Foundation

Jakob van Zyl, Jet Propulsion Laboratory

Michael Salamon, Mission Directorate Coordinator, *Designated Federal Official*

Rich Capps, Advanced Planning and Integration Office Coordinator (JPL)

Ex Officio and Liaison


Louis Barbier, Goddard Space Flight Center

Roy Gould, Harvard Center for Astrophysics, Education Roadmap Committee Liaison

Steve Maran, American Astronomical Society, community and media liaison

Staff

Gary Blackwood, Systems Engineer, Jet Propulsion Laboratory



“Search for Earth-like planets and habitable environments around other stars”

Universe

“Explore our Universe to understand its origin, structure, evolution, and destiny”

What Powered the Big Bang?

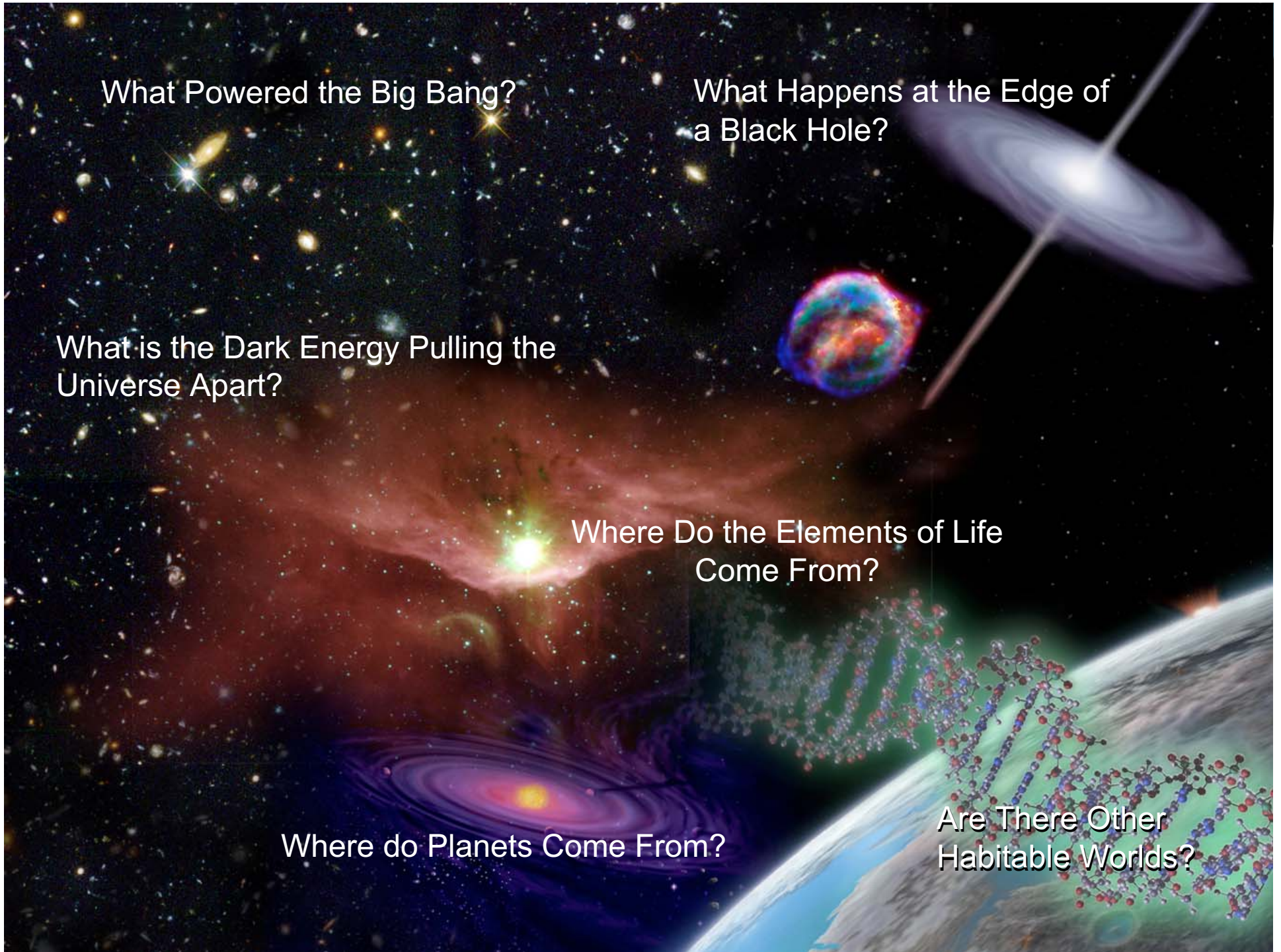
What Happens at the Edge of
a Black Hole?

What is the Dark Energy Pulling the
Universe Apart?

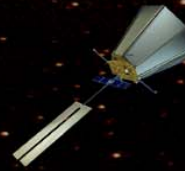
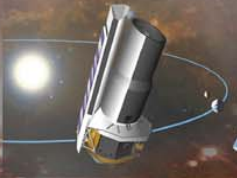
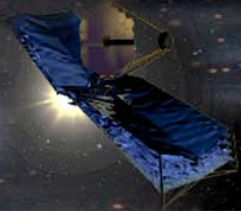
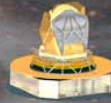
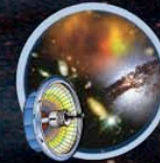
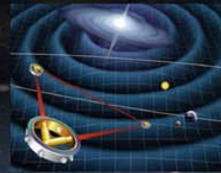
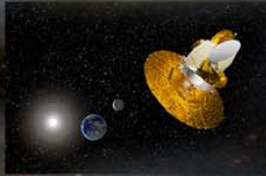
Where Do the Elements of Life
Come From?

Where do Planets Come From?

Are There Other
Habitable Worlds?



BEYOND EINSTEIN



ORIGINS



2010

2020



- What, if anything, is missing from the current program?
- Has the community had adequate opportunity to provide input?
- How is the Division planning to manage its resources for the strategic questions?
- Where do the missions go (question 4 or question 8)?



Legacy Roadmap Team Members

Adam Burrows
Andrew Blain
Geoff Blake
George Rieke
Michael Meyer
Jamie Bock
Joel Bregman
Jack Hughes
Stephen Unwin
Alycia Weinberger
Tom Greene
Jim Green
Vikki Meadows
David Weinberg
Colin Norman
Harry Ferguson
Wes Traub
David Spergel

Michael Devirian
Michael Greene
Doug Richstone
Mike Cherry
Brenda Dingus
Sam Finn
Louis Barber
Craig Hogan
Mike Hauser
Mike Shara
Sally Heap
Jim Ulvestad
Kathryn Flanagan
Lee Mundy
Ned Wright
Alan Dressler
Jim Breckinridge
Michael Salamon
Eric Smith



NASA Strategic Goals

Goal 1 Implement a sustained and affordable human and robotic program to explore the solar system and beyond

Goal 2 Extend human presence across the solar system, starting with a human return to the Moon by the year 2020, in preparation for human exploration of Mars and other destinations

Goal 3 Develop innovative technologies, knowledge, and infrastructure both to explore and to support decisions about the destinations for human exploration

Goal 4 Promote international and commercial participation in exploration to further U.S. scientific, security, and economic interests

Goal 5 Study the Earth system from space and develop new space-based and related capabilities for this purpose

Science Mission Directorate

Councils

- Leadership Council
- Science Management Council
- Program Management Council
- Operations Council

Associate Administrator (AA)

A. Diaz

Deputy AA

G. Asrar

**Deputy AA
For Management**

A. McNally

**Deputy AA
For Programs**

O. Figueroa

Education Officer

AAA/Strategy, Policy & Int'l
AAA/Science
AAA/Technology
AAA/Exploration Mission Int.
Sr. Policy Advisor

Mission Support

**NASA
Management Office**

R. Parker

**Administrative
Processes**

C. Sorrels

Mission

**Earth-Sun
System**

M. Cleave (act.)

**Solar
System**

A. Dantzler (act.)

Universe

A. Kinney

Mission Enabling

**Business
Management**

R. Maizel

NASA Centers

JPL

C. Elachi

GSFC

E. Weiler

ARC

S. Hubbard

**Mission & Systems
Management**

M. Luther

